

REMARKS

In the final Office Action¹, the Examiner rejected claims 24-28 and 30 under U.S.C. §102(e) as being anticipated by Zenhausern et al. (U.S. Publication No. 2004/0011650, hereafter "Zenhausern"); rejected claims 3-21, 24, and 29 under 35 U.S.C. §103(a) as being unpatentable over Zenhausern in view of Sato and further in view of Eichen et al. (U.S. Publication No. 2003/0203394, hereafter "Eichen"); provisionally rejected claims 3-7 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-12 of copending Application No. 11/221,940 (hereafter "the '940 Application") in view of Sato and further in view of Eichen; and provisionally rejected claims 3-7 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-11 of copending Application No. 11/145,977 (hereafter "the '977 Application") in view of Sato and further in view of Eichen.

By this Amendment, Applicants propose to amend claims 8, 18, and 24. Support for the claim amendments can be found in the specification at, for example, page 44, lines 16-22. Claims 3-21 and 24-30 remain pending and under consideration.

Applicants respectfully traverse the rejection of claims 24-28 and 30 under U.S.C. §102(e) as being anticipated by Zenhausern.

Claim 24, as amended, recites a hybridization detector, comprising, for example, "a reaction region . . . ; counter electrodes disposed in the reaction region, each of the counter electrodes having a first surface facing the reaction region; and floating-

¹ The Office Action contains a number of statements reflecting characterizations of the related art and the claims. Regardless of whether any such statement is identified herein, Applicants decline to automatically subscribe to any statement or characterization in the Office Action.

potential electrodes . . . , each of the floating-potential electrodes having a second surface facing the reaction region, wherein the second surface is narrower than the first surface," (emphasis added). Zenhausern fails to teach or suggest these elements.

Zenhausern, at paragraph [0254], discloses:

FIG. 3 depicts a top-down view of the module. Module 500 is provided on a substrate, and preferably within a fluid chamber or channel, as described above. Five electrode pairs 501, 502, 503, 504, and 505 are situated between four large outer electrodes 510, 511, 512, and 513. The number of electrodes is not limited to five pairs and four outer electrodes, and is intended to be illustrative only. The electrode pairs and outer electrodes may be advantageously connected to bondpads 515, which may be placed in a standard arrangement to facilitate packaging or integration with other modules. FIG. 4 depicts a detailed view of one of the five electrode pairs, electrode pair 501. The electrode pairs consist of two electrodes, 530 and 531, having interdigitating fingers with 2 μ m line and spacings. One of these interdigitated electrodes (per pair) functions as an electrophoretic/dielectrophoretic electrode, 530, and the other acts as a floating electrode, 531.

(Emphasis added). Accordingly, Zenhausern fails to disclose a combination, "wherein [a] second surface [of a floating-potential electrode] is narrower than [a] first surface [of a counter electrode]," as recited in amended claim 24. In addition, because floating-potential electrode 531 includes fingers and electrodes 510, 511, 512, and 513 are of round shapes, Zenhausern suggests that a surface of the fingers of floating-potential electrode 531 facing the reaction region is *wider* than the surface of round shaped electrodes 510, 511, 512, and 513. Accordingly, claim 24 distinguishes over Zenhausern. Claims 25-28 and 30 depend from claim 24 and thus distinguish over Zenhausern at least due to their dependence.

Applicants respectfully traverse the rejection of claims 3-21, 24, and 29 under 35 U.S.C. §103(a) as being unpatentable over Zenhausern in view of Sato and further in view of Eichen.

Claim 3 recites a sensor chip, comprising,

a reaction region for hybridization between nucleotide probes and target nucleotide sequences having a base sequence complementary to the nucleotide probes;

counter electrodes generating an electric field for stretching the nucleotide probes in the reaction region;

scanning electrodes arrayed in the reaction region; and

dielectrophoresis means for migrating the stretched nucleotide probes toward a pair of adjacent electrodes of the scanning electrodes by a non-uniform electric field generated by applying a voltage between the adjacent electrodes, wherein the adjacent electrodes are bridged by nucleotide probes immobilized between the adjacent electrodes.

(Emphasis added). Zenhausern, Sato, and Eichen, alone or combined, fail to teach at least the adjacent electrodes being bridged by nucleotide probes.

The Examiner acknowledged, "Zenhausern et al. and Sato et al. are silent about bridging the electrodes by nucleic acids." Final Office Action at 17. The Examiner cited Eichen to cure the deficiencies of Zenhausern and Sato. However, Eichen fails to cure the deficiencies of Zenhausern and Sato.

Specifically, Eichen, at paragraph [0135], discloses,

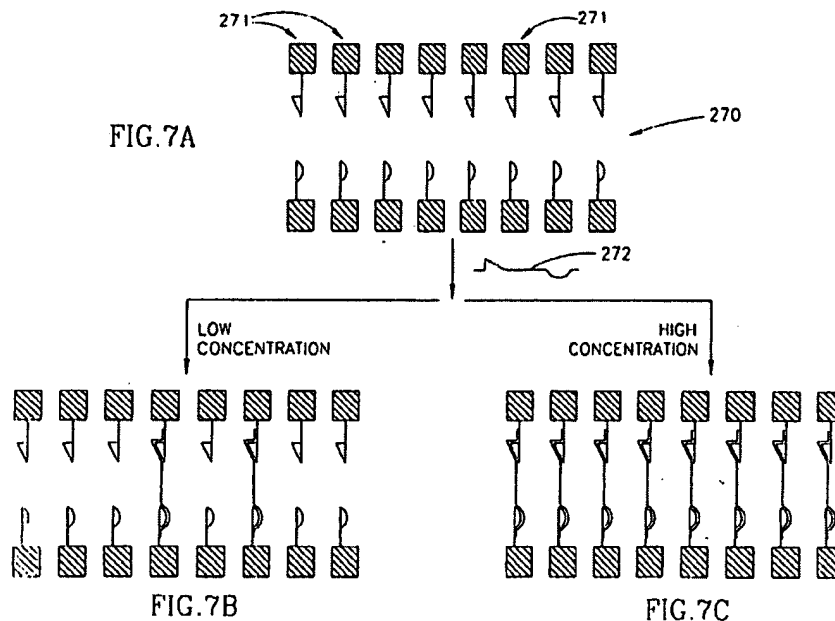
When the assay device 102 is contacted with a sample comprising a target 114, a path 116 forms between the two electrodes 104 and 106. By subsequent steps (see below) a conductive bridge is formed and current can flow through the bridge between the two terminals of module 108, as represented by the B-directional arrow 118 (b). In the embodiment shown in FIG. 1, the assay set comprises two electrodes.
(Emphasis added).

Although Eichen teaches electrodes 104 and 106 may be bridged by target 114, Eichen does not teach electrodes 104 and 106 are *adjacent* electrodes. In fact, Eichen, at paragraph [0147], discloses,

FIG. 7 is a schematic illustration of a device 270 having a plurality of assay sets 271, each comprising two electrodes and having the same recognition moieties immobilized thereon. When the naive assay device 270 is contacted, for a given time period, with a target 272, in the case of a low concentration, paths between the different electrodes of each assay set forms only in a few assay sets, whereas in the case of a high concentration (b2) bridges form in many (at times all). After steps for yielding a conductive bridge are carried out, counting the number of units where current is detected, indicates the concentration of the target 272 in the sample.

(Emphasis added). Accordingly, as evident from FIG. 7 of Eichen, reproduced below, Eichen teaches that target 272 bridges *opposite* electrodes. Accordingly, Eichen cannot teach or suggest a combination comprising "dielectrophoresis means for migrating the stretched nucleotide probes toward a pair of adjacent electrodes of the scanning electrodes by a non-uniform electric field generated by applying a voltage between the adjacent electrodes, wherein the adjacent electrodes are bridged by nucleotide probes immobilized between the adjacent electrodes," as recited in claim 3 (emphasis added).

Further, Eichen teaches that the number of bridges formed by the targets indicates the concentration of the targets in a sample. Accordingly, Eichen does not suggest bridging adjacent electrodes. In fact, if adjacent electrodes of Eichen are bridged by the targets, no additional current path will be formed to indicate the change of concentration of the targets in the sample. Accordingly, one of ordinary skill in the art would not be motivated to modify Eichen to bridge adjacent electrodes.



For at least the above reasons, Eichen fails to cure the deficiencies of Zenhausern and Sato. Accordingly, claim 3 distinguishes over Zenhausern, Sato and Eichen.

Claims 4-6 depend from claim 3 and thus distinguish over Zenhausern, Sato, and Eichen at least due to their dependence.

Claim 8, as amended, recites a sensor chip, "wherein the energized scanning electrode and a second scanning electrode adjacent to the energized scanning electrode are bridged by nucleotide probes immobilized between the energized scanning electrode and the second scanning electrode," (emphasis added). For at least the reasons set forth above, Zenhausern, Sato, and Eichen, alone or combined, fail to

teach the energized scanning electrode and a second scanning electrode adjacent to the energized scanning electrode being bridged by nucleotide probes. Accordingly, claim 8 distinguishes over Zenhausern, Sato, and Eichen.

Claims 9-13 depend from claim 8 and thus distinguish over Zenhausern, Sato, and Eichen at least due to their dependence.

Claim 14 recites a sensor chip, "wherein the adjacent electrodes of the first scanning electrodes are bridged by the first group of the nucleotide probes immobilized between the adjacent electrodes of the first scanning electrodes, and the adjacent electrodes of the second scanning electrodes are bridged by the second group of the nucleotide probes immobilized between the adjacent electrodes of the second scanning electrodes," (emphasis added). For the reasons set forth above, Zenhausern, Sato, and Eichen, alone or combined, fail to teach at least the adjacent electrodes of the first scanning electrodes being bridged by the first group of the nucleotide probes and the adjacent electrodes of the second scanning electrodes being bridged by the second group of the nucleotide probes. Accordingly, claim 14 distinguishes over Zenhausern, Sato, and Eichen.

Claims 15-17 depend from claim 14 and thus distinguish over Zenhausern, Sato, and Eichen at least due to their dependence.

Claim 18, as amended, recites a sensor chip, "wherein the energized scanning electrode and the second scanning electrode adjacent to the energized scanning electrode are bridged by the stretched nucleotide probes," (emphasis added). For at least the reasons set forth above, Zenhausern, Sato, and Eichen, alone or combined, fail to teach at least the energized scanning electrode and the second scanning

electrode adjacent to the energized scanning electrode are bridged by the stretched nucleotide probes. Accordingly, claim 18 distinguishes over Zenhausern, Sato, and Eichen.

Claims 19-21 depend from claim 18 and thus distinguish over Zenhausern, Sato, and Eichen at least due to their dependence.

Claim 24, as amended, recites a hybridization detector, comprising, for example, "a reaction region . . . ; counter electrodes disposed in the reaction region, each of the counter electrodes having a first surface facing the reaction region; and floating-potential electrodes dispersed in a matrix layout between the counter electrodes, each of the floating-potential electrodes having a second surface facing the reaction region, wherein the second surface is narrower than the first surface," (emphasis added). As discussed above, Zenhausern fails to teach or suggest a combination, "wherein the second surface is narrower than the first surface," as recited in claim 24. Sato and Eichen fail to cure the deficiencies of Zenhausern. Accordingly, claim 24 distinguishes over Zenhausern, Sato, and Eichen.

Claims 29 depends from claim 24 and thus distinguishes over Zenhausern, Sato, and Eichen at least due to its dependence.

Because the Examiner's nonstatutory obviousness-type double patenting rejections of claims 3-7 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-12 of the '940 Application in view of Sato and further in view of Eichen, and over claims 1-11 of the '977 Application in view of Sato are provisional, Applicants will address these rejections either when this

application issues, or when any one of the '940 Application and the '977 Application issues.

Applicants respectfully request that this Amendment under 37 C.F.R. § 1.116 be entered by the Examiner, placing this application in condition for allowance.

Alternatively, Applicants submit that the entry of the amendment would place the application in better form for appeal, should the Examiner dispute the patentability of the pending claims.

In view of the foregoing remarks, Applicants respectfully request reconsideration of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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